What is Claimed is:

1. A multi-turn pulse width modulation (PWM) generator for generating a PWM output corresponding to multiple 360 degree turns, comprising:

a counter for receiving a reference signal, and for counting a number of cycles of the reference signal to generate a binary output corresponding to the number of cycles counted;

a frequency divider for receiving a sensor output signal, and for dividing a frequency of the sensor output signal by the number of turns in the multiple turns to generate a frequency divided signal, wherein the sensor output signal has substantially the same frequency as the reference signal, but can be offset in phase from the reference signal;

a demultiplexer for receiving the binary output, and for generating a plurality of turn indicator signals, each corresponding to one of the multiple turns;

a multiplexer for receiving the turn indicator signals and a mechanical turn indicator signal, and for selecting one of the turn indicator signals that corresponds to the mechanical turn indicator signal; and

at least one flip flop for receiving the selected one of the turn indicator signals and the frequency divided signal, and for generating the PWM output using the selected one of the turn indicator signals and the frequency divided signal.

2. The multi-turn PWM generator of claim 1, wherein a duty cycle of the PWM output is determined by a difference in phase between the selected one of the turn indicator signals and the frequency divided signal.

3. The multi-turn PWM generator of claim 1, wherein the at least one flip flop comprises a first flip flop for receiving the selected one of the turn indicator signals and a second flip flop for receiving the frequency divided signal,

wherein an output of the second flip flop is provided to a first flip flop as an input,

wherein each rising edge of the selected one of the turn indicator signals sets the first flip flop, and wherein each rising edge of the frequency divided signal resets the first flip flop, and

wherein an output of the first flip flop is the PWM output.

4. The multi-turn PWM generator of claim 1, wherein the counter repeatedly counts from 0 to the number of turns minus 1, and resets.

5. The multi-turn PWM generator of claim 1, further comprising a latch for storing the mechanical turn indicator signal, wherein a content of the latch does not change during normal operation of the multi-turn PWM generator.

6. The multi-turn PWM generator of claim 1, wherein the number of turns is five.

7. The multi-turn PWM generator of claim 1, wherein the counter is an M-bit counter, wherein M is calculated using $\log_2$(the number of turns).

8. A multi-turn angular position sensor for sensing rotation about an axis comprising:

a transmitter disk having a plurality of transmitter loop antennas formed thereon;

a receiver disk having a plurality of receiver loop antennas formed thereon, each said receiver loop antenna corresponding to one of the transmitter loop antennas, wherein the transmitter disk and the receiver disk are substantially fixed with respect to each other about the axis;

a coupler disk having an attenuation pattern formed thereon for variably attenuating signals transmitted from the transmitter loop antennas and received by the receiver loop antennas, wherein the coupler disk is rotatable about the axis with respect to the transmitter and receiver disks;

a digital signal generator for generating a plurality of local oscillator signals and a reference signal;

a mixer for receiving the local oscillator signals and the signals received by the receiver loop antennas, and for generating a sensor output signal representing an angular position of the coupler disk about the axis; and

a multi-turn PWM generator for generating a PWM output corresponding to multiple 360 degree turns, comprising:

a counter for receiving a reference signal, and for counting a number of cycles of the reference signal to generate a binary output corresponding to the number of cycles counted;

a frequency divider for receiving the sensor output signal, and for dividing a frequency of the sensor output signal by the number of turns in the multiple turns to generate a frequency divided signal, wherein the sensor output signal has substantially the same frequency as the reference signal, but can be offset in phase from the reference signal;

a demultiplexer for receiving the binary output, and for generating a plurality of turn indicator signals, each corresponding to one of the multiple turns;

a multiplexer for receiving the turn indicator signals and a mechanical turn indicator signal, and for selecting one of the turn indicator signals that corresponds to the mechanical turn indicator signal; and

at least one flip flop for receiving the selected one of the turn indicator signals and the frequency divided signal, and for generating the PWM output using the selected one of the turn indicator signals and the frequency divided signal.

9. The multi-turn angular position sensor of claim 8, wherein a duty cycle of the PWM output is determined by a difference in phase between the selected one of the turn indicator signals and the frequency divided signal.

10. The multi-turn angular position sensor of claim 8, wherein the at least one flip flop comprises a first flip flop for receiving the selected one of the turn indicator signals and a second flip flop for receiving the frequency divided signal,

wherein an output of the second flip flop is provided to a first flip flop as an input,

wherein each rising edge of the selected one of the turn indicator signals sets the first flip flop, and wherein each rising edge of the frequency divided signal resets the first flip flop, and

wherein an output of the first flip flop is the PWM output.

11. The multi-turn angular position sensor of claim 8, wherein the counter repeatedly counts from 0 to the number of turns minus 1, and resets.

12. The multi-turn angular position sensor of claim 8, wherein the multi-turn PWM generator further comprises a latch for storing the mechanical turn indication signal, wherein a content of the latch does not change during normal operation of the multi-turn PWM generator.

13. The multi-turn angular position sensor of claim 8, further comprising an analog converter for converting the PWM output to an analog signal output.

14. The multi-turn angular position sensor of claim 8, wherein the PWM output has a duty cycle of 0% to 100%, the sensor further comprising a PWM converter for converting the PWM output to have a duty cycle different from 0% to 100%.

15. A method of generating a multi-turn pulse width modulation (PWM) signal corresponding to multiple 360 degree turns, comprising:

counting a number of cycles of a reference signal to generate a binary output corresponding to the number of cycles counted;

dividing a frequency of a sensor output signal by the number of turns in the multiple turns to generate a frequency divided signal, wherein the sensor output signal has substantially the same frequency as the reference signal, but can be offset in phase from the reference signal;

generating a plurality of turn indicator signals using the binary output, each said turn indicator signal corresponding to one of the multiple turns;

selecting one of the turn indicator signals that corresponds to a mechanical turn indicator signal; and

generating the PWM output using the selected one of the turn indicator signals and the frequency divided signal.

16. The method of claim 15, wherein a duty cycle of the PWM output is determined by a difference in phase between the selected one of the turn indicator signals and the frequency divided signal.

17. The method of claim 15, wherein generating the PWM output comprises:

setting a flip flop using each rising edge of the selected one of the turn indicator signals; and

resetting the flip flop using each rising edge of the frequency divided signal,

wherein an output of the first flip flop is the PWM output.

18. The method of claim 15, wherein counting comprises: repeatedly counting from 0 to the number of turns minus 1, and resetting.

19. The method of claim 15, further comprising storing the mechanical turn indicator signal in a latch, wherein a content of the latch does not change during normal operation of the multi-turn PWM generator.

20. A multi-turn pulse width modulation (PWM) generator for generating a PWM output corresponding to multiple 360 degree turns, comprising:

circuit means for receiving a reference signal and a mechanical turn indicator signal, and for generating, using the reference signal, a turn indicator signal that corresponds to the mechanical turn indicator signal;

a frequency divider for receiving a sensor output signal, and for dividing a frequency of the sensor output signal by the number of turns in the multiple turns to generate a frequency divided signal, wherein the sensor output signal has substantially the same frequency as the reference signal, but can be offset in phase from the reference signal; and

at least one flip flop for receiving the turn indicator signal and the frequency divided signal, and for generating the PWM output using the turn indicator signal and the frequency divided signal.